

by mouth is better because it avoids the ecchymosis caused by the needle in the parenteral administration of ACTH.

While recognizing that in the present case the combination of eczema, renal abnormality and purpura suggested the diagnosis of one of the diseases of ground substance such as polyarteritis nodosa or lupus erythematosus, such a diagnosis was not warranted in view of the pathologic report on the muscle biopsy.

SUMMARY

A case of a patient at the full term of pregnancy who had glomerulonephritis in the degenerative stage, atopic eczema of the face and arms, and idiopathic thrombocytopenic purpura, is presented.

The bleeding tendency responded miraculously two times—once to ACTH, which made uneventful delivery of a normal infant possible, and the second time to cortisone, which made uneventful splenectomy possible. The nephrotic condition and eczema remained, but the bleeding tendency was still in remission eight months after splenectomy.

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Interscapular Hibernoma—Report of a Case with a Brief Review of the Literature

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THE OCCURRENCE, in man,^{2, 4, 7, 9, 10, 15} of peculiar lipomatous tumors featuring the presence of multiglobular fat, has occasionally been reported since Merkel,¹¹ in 1905, recorded the first instances. It was his belief that the growth was an adenoma of sebaceous glands. Gery,⁷ however, in 1914, discussing a case reported by Bonnel,² called attention to the rather striking resemblance of the tumor, as microscopically observed, to the so-called hibernating gland of certain winter-sleeping mammals. Gery's suggestion that the term *hibernoma* be applied to these neoplasms was well received—and perhaps fortunately so. Although perhaps incorrectly implying that the neoplasm arose from some vestigial hibernating gland in the human species, the epithet *hibernoma* was so arresting that it led to special cataloguing in the literature.

In 1949 Brines and Johnson⁴ published a detailed report of an interesting example of the condition and an excellent review of hibernomas. Ten cases (including one they reported) they listed as being authentic examples; seven others they did not consider sufficiently documented to warrant inclusion among the chosen few. Since the appearance of this review, Simon¹⁵ has described a posterior cervical tumor of like nature and Kittle, Boley and Schafer¹⁰ have reported a mediastinal tumor of this type. In both cases the tumor apparently was a hibernoma.

Special gross, microscopic and histochemical features of these tumors have been thoroughly discussed by the previously mentioned investigators, who, along with oth-

ers,^{1, 3, 5, 6, 12-14, 17} have dealt at length with the histogenesis of adipose tissue and its possible functions. Likewise, the relation of normal and tumorous fatty tissue to the so-called hibernating gland has been extensively investigated. Following is a report of a case of interscapular hibernoma, the thirteenth case of hibernoma to be recorded and the sixth in which the tumor originated at this site.

REPORT OF A CASE

A white housewife, 40 years of age, was admitted to the Hanford Sanitarium, Hanford, December 10, 1950, because of a large lump between the shoulder blades. The patient had first noticed the mass about ten or twelve years previously when it began to cause some discomfort when she was lying supine. Although it never had been painful, it had become more and more awkward to the patient as it gradually increased in size. Finally, in later years, development of the mass had made resting in a supine position impossible.

The patient was well-developed and well-nourished. The body weight was 130 pounds. On the posterior part of the upper portion of the thoracic wall between the scapulae was a mass so large and so deep in position that the peripheral borders of the scapulae overrode it. This was especially true of the right scapula, which when adducted became very prominent as it surmounted the growth. On palpation, the mass was freely movable beneath the skin and scapulae. It was rather firmer in consistency than the adjacent structures.

No abnormality was noted in examination of the blood or in urinalysis.

In view of the duration, size, shape, mobility, consistency, and position of the mass, it was thought to be a large lipoma. At operation the lesion was observed to be a large, firm, circumscribed, discoid, golden-yellow mass which was situated in the subcutaneous tissue. It had pushed the trapezius muscle aside in such a manner that the right margin of the muscle lay beneath the scapula. A lateral projection of the tumor extended into the axilla. Some portions of the attachments to adjacent tissues were very vascular. The tumor was removed completely except for the portion which had extended into the axilla. The operative wound was closed with little difficulty. The postoperative course was

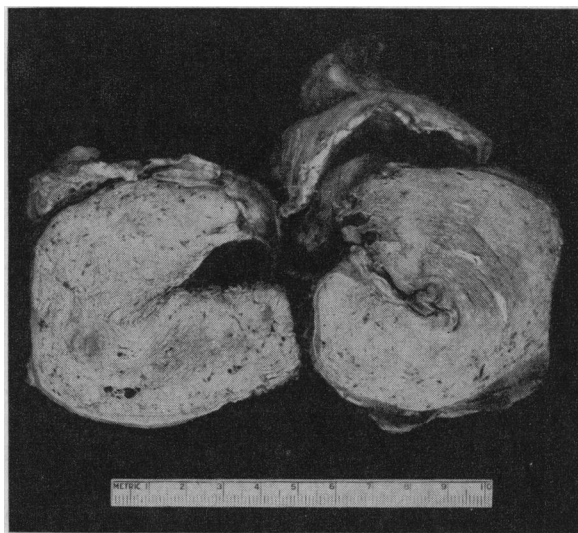


Figure 1.—Interscapular hibernoma. The cut surface is pale and fairly homogeneous, and encapsulation is apparent.

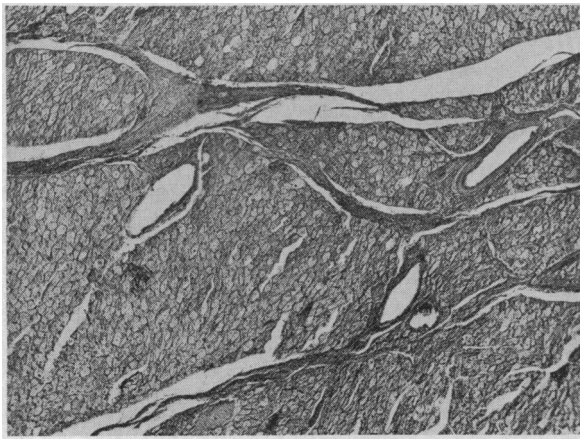


Figure 2.—Subdivision of interscapular hibernoma into compartments or lobules. Large dilated blood vessels are coursing through the fibrous septa. (Stained with hematoxylin and eosin; $\times 40$.)

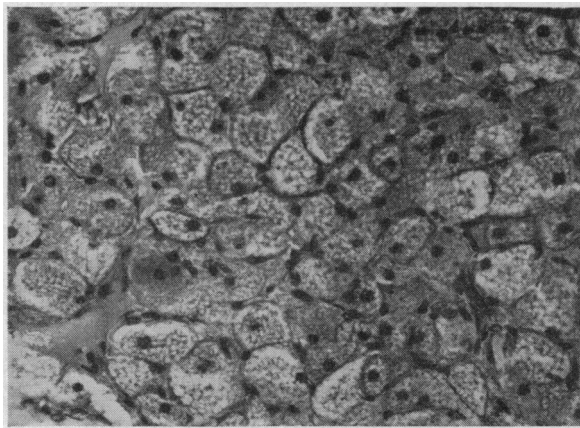


Figure 3.—Central nuclei and voluminous vacuolated cytoplasm. Cell borders are distinct, and the appearance is like that of pavement epithelium. (Stained with hematoxylin and eosin; $\times 250$.)

uneventful. When the patient was dismissed from the hospital on the fifth day after the operation, she was free of symptoms.

The surgical specimen measured 14 by 6.5 by 3 cm. (Figure 1). It was loosely resilient. The cut surface was a golden-tan color and had a lobulated pattern remarkably like that of the normal pancreas. The tumor contained numerous thin-walled, rather large vessels which were especially prominent in the peripheral portions. The largest of these were 2 cm. in diameter.

In microscopic examination it was noted that a capsule composed of loose collagenous tissue, containing large thin-walled vessels, invested the tumor, and gave rise to septa of like composition which were directed into the substance of the growth. When sections were examined with the low-power objective, the outstanding feature was a peculiar glandlike appearance (Figure 2). This was produced by connective septa which everywhere divided the tumor into alveolar units made up of from 10 to 100 cells. Thin-walled vessels, large and small, coursed through the supporting stroma to supply individual cellular compartments.

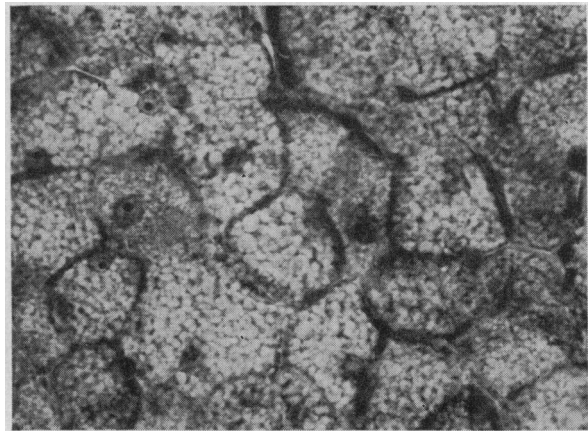


Figure 4.—Nuclei containing prominent nucleoli. The cytoplasm is packed with vacuoles which are of a fairly constant size. (Stained with hematoxylin and eosin; $\times 425$.)

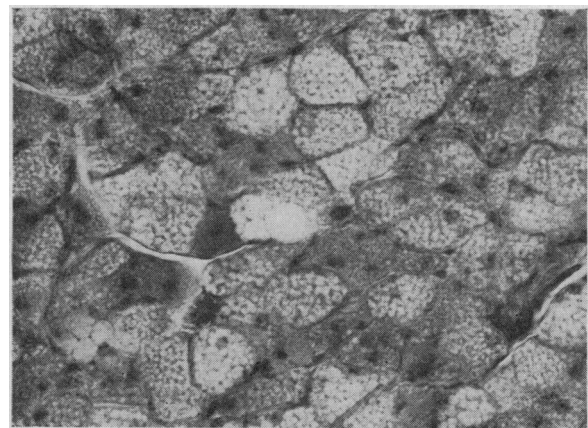


Figure 5.—Fusion of vacuoles (center of field) suggests transition to adult fat cells found scattered throughout the tumor. Granules in addition to vacuoles may be noted in some cells in this section. (Stained with hematoxylin and eosin; $\times 280$.)

When viewed with higher-power objective, the tumor cells appeared large, polygonal, and highly vacuolated (Figure 3). The average diameter of the cells was 40 microns. Cell membranes were so sharp as to give the cells a very definite pavement appearance. The cytoplasm, which constituted 90 per cent of the cellular volume, was rather clear and eosinophilic. It was packed with granules and vacuoles. The latter varied from 2 to 3 microns in diameter (Figure 4). The vast majority of the cells contained hundreds of vacuoles, but here and there, as a result of fusion, a cell containing one or two large globules which occupied most of the cytoplasm, was observed. These latter forms were interpreted as representing transitions to adipose connective tissue elements which were scattered throughout the substance of the tumor (Figure 5).

The nuclei were round or oval, and were hyperchromatic. Each nucleus contained a large nucleolus. The diameter of the nuclei averaged about 6 microns, and the position was uniformly central except in occasional cells in which confluent vacuoles had pushed the nucleus to one side. Flattening of the nucleus even under these circumstances was

rarely of the degree noted in adipose connective tissue cells. When special stains for fat were applied, such as the osmic acid and Sudan 3 stains, there was observed to be a large amount of fat in the vacuoles and in many of the granules.

A specimen of the tumor which had been fixed in formalin was submitted to Dr. M. H. Power of the Section of Biochemistry of the Mayo Clinic. When the specimen was dried in vacuo, it lost 54 per cent of its dried weight. A portion of the dried sample weighing 460 mg. was treated with acidified alcohol-ether mixture, and the extract was evaporated to dryness. By resolution of the residue in petroleum ether followed by filtration and reevaporation to dryness, the amount of dry lipid was found to be 260 mg. (56.6 per cent). Titration of this fat residue in benzene consumed only 1.0 ml. of tenth-normal base, an equivalent of 28.4 mg. of fatty acid. It was determined by tests that only small amounts of cholesterol and of lecithin were present. It appeared, therefore, that the lipid material in the submitted specimen was largely neutral fat.

When the patient was last examined, in January 1952, she was in excellent health and there was no evidence of recurrence of the tumor.

COMMENT

Inasmuch as the microscopic configuration noted in all reported hibernomas in human beings has been so nearly like that of the so-called hibernating gland, brief mention of the structure of the latter is pertinent. Moreover, since Hatai,⁸ Shattock¹³ and other authors have described interscapular masses of hibernat fat found in human beings, seemingly there is ready explanation of the origin and site of the tumor in the case here reported.

The hibernating gland, which originally was described in 1670 by Velsch,¹⁶ has been studied by a number of investigators, and from their reports the following observations may be made. It does not occur as a distinct organ in all species of winter-sleepers, and it occasionally is found as a tissue distinct from ordinary fat in a number of non-hibernating animals. In many species, hibernating as well as non-hibernating, clusters of cells having the moruloid appearance of the hibernating gland but lacking the glandular arrangement may be found in the mediastinal, retroperitoneal, cervical, axillary and interscapular regions. These clusters of cells are often intermingled with masses of ordinary fat, the cells of which are uniglobular. The proportion of multiglobular and uniglobular fat frequently changes with age, and there is rather good evidence to support the opinion that the former changes into the latter. The reverse of this mutation has not been observed.

Most current opinion, therefore, supports the view that hibernat tissue is not to be regarded as a gland, and that it is not even essential in the metabolic economy of hibernation. The theories that this fat is modified thymic tissue, that it participates in hematopoiesis, and that it elaborates some kind of internal secretion are mentioned merely to cite their abandonment.

In light of observations in embryologic studies on the histogenesis of adipose tissue by Bell,¹ Rasmussen,¹² Wells,¹⁷ Shattock¹³ and others it seems more logical that the tumor derives from such tissue rather than from a hibernating glandular homologue which does not actually exist. Pertinent details of the process are as follows: The primary phase of the development of adipose tissue occurs in early embryonic life when minute oily droplets develop within the cytoplasm of certain spindle and stellate vascular mesenchymal tissues. It is not certain whether this mesenchyme is predestined to become a repository for lipoids or whether it

is pluripotential, but the matter is unimportant from the standpoint of this thesis.

In certain situations, as in subcutaneous tissue, very early fusion of fat globules occurs, the cells becoming uniglobular, and the nuclei, greatly compressed, assuming a position at the periphery. The result is adipose tissue "ordinaire." In other zones, notably the mediastinal, retroperitoneal, cervical, axillary and interscapular, the previously mentioned process of fusion is delayed or does not occur, the cellular end products being round and having a multiglobular or moruloid appearance. When, as in the case of winter-sleeping species, there is organization into compartmental units and retention of the primitive vascular pattern, the so-called hibernating gland develops. Multilobular fat may, therefore, be looked upon as a stage of arrest, so to speak, in the formation of ordinary adipose tissue, and hibernomas may be considered tumefactive proliferations of these "immature" elements.

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